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REMARKS

Claims 1-23 and 39-42 were previously pending. Claims 1, 7, 21-22, and 39 are amended herein. Claims 2 and 6 have been cancelled. Claims 55-81 were added, and have support in original Claims 24-38 and 43-54.. Support for the amendment to Claims 1 and 39 can be found in the specification and claims as filed, for example, Claims 2 and 6. The changes made to the Specification and Claims by the current amendment, including ~~deletions~~ and additions, are shown herein with deletions designated with a strikethrough and additions underlined. No new matter has been added herewith. As a result of the amendments, Claims 1, 3-5, 7-23, 39-42 and 55-79 are presented for further examination.

New Claims 55-81 correspond to original Claims 24-38 and 43-54 which were mistakenly cancelled. These claims are drawn to a non-elected invention. However, Applicants would like the Examiner to note that the claims are dependent upon elected claims and include all of the limitations of the elected claims. As such, rejoinder of Claims 55-81 is requested upon allowance of the elected claims.

Rejection under 35 U.S.C. §112, second paragraph

The Examiner has rejected Claims 1-23 and 39-42 as indefinite for the following reasons:

The Examiner has rejected claims 1 and 39 as indefinite for the recitation of “substantially”. However, one of skill in the art would understand how the term is used in this context. Laser ablation means the removal of material by vaporization with a laser. The term “substantially” non-ablatable has been used to indicate that although the first layer is transparent to laser wavelength, it is well known to those skilled in laser ablation that no material is fully transparent to laser wavelength and a small amount of ablation can occur. Thus, the term “substantially non ablatable” is intended to indicate that any ablation or removal of the first layer that occurs is insignificant and does not affect the structure of the invention. Please note however that while the structure is recited to be “substantially non-ablatable,” it is also recited to be capable of thermal degradation, which is a different process.

Claim 2 has been rejected for the recitation of the phrase “at least two localized areas having molecule-adsorbing capacities for molecules with different adsorbing properties”. Claim 2 has been cancelled rendering the rejection moot.

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Claim 4 has been rejected because the examiner believes the term “informationally-addressable” is vague and indefinite. However, on page 10, lines 16-17, the term is defined as “the ability of the profiled features to encode information about an array or an assay.” The following paragraph starting on line 18 further describes the type of information that can be encoded. For example, the profiled feature can encode information relating to the molecule adsorbed on the surface of the first layer, or the concentrations of the adsorbed molecule. Alternatively the profiled feature can include information such as the source of the adsorbed molecule or in a diagnostic assay, information relating to the patient being tested. A person skilled in the art would clearly understand the term “informationally-addressable” based on the definition in the specification, along with the other disclosure of the specification and the knowledge of the skilled individual.

Claims 21-22 have been rejected because the Examiner believes the term “sub-microns” is vague and indefinite. The claims have been amended by replacing the term “sub-micron” with “less than 1 micron,” because it is clear that the term sub-micron refers to sizes of less than 1 micron. Thus, no change in meaning of the claim has been made.

Rejection under 35 U.S.C. §102(b)

Claims 1-5, 15-16, 20 and 39-42 were rejected under 35 U.S.C. §102(b) as anticipated by Brizzolara (US patent No. 5,858,801, Mar. 13 1997). The Examiner believes that Brizzolara teaches the structure as claimed.

To be anticipatory under 35 U.S.C. § 102, a reference must teach each and every element of the claimed invention. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379 (Fed. Cir. 1986). “Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference. ...There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention.” *See Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991).

Claims 1 and 39 have been amended to incorporate the features of Claims 2 and 6, such that it recites “wherein the exposed surface of the first layer has a plurality of different localized areas having different molecule-adsorbing capacities for molecules with different adsorbing properties.”

Brizzolara is directed to a patterned substrate for use in biosensors produced by 1. coating an antibody-adsorbent substrate with a material that resists antibody adsorption, and 2. using ion beam sputtering, laser ablation, or mechanical scribing to remove the coating at specific sites on the substrate. Brizzolara does not teach that the exposed surface of the first layer has a plurality of different localized areas having different molecule-adsorbing capacities for molecules with different adsorbing properties, such as hydrophobic, hydrophilic, acidic, basic, charged or neutral. Brizzolara describes **only** the binding of antibodies to the exposed surface of the antibody-adsorbent substrate and indicates at column 4, lines 3 to 5 that:

"The adsorption should be a spontaneous, physical process. In general, any hydrophobic material should be suitable for this purpose."

Thus, Brizzolara clearly indicates that the surface of the antibody-adsorbent substrate must be hydrophobic. Hydrophobicity is only one surface property, as such it cannot represent "different localized areas having different molecule-adsorbing capacities."

The feature that the exposed surface of the first layer has localized areas having "different localized areas having different molecule-adsorbing capacities" provides a surface which can adsorb different molecules at the different localized areas. The adsorbed molecules may or may not be antibodies. Furthermore, the localized areas can present differing degrees of hydrophobicity, as well as presenting localized areas exhibiting hydrophilic, acidic, basic, charged or neutral properties. As a result, different localized areas can adsorb molecules with differing adsorbing properties. At page 7, line 10 to page 8, line 2, the specification describes a micro-well or micro-channel having three localized areas of differing adsorbing properties, a central area which is the most hydrophobic, an area between the centre and the edge which is less hydrophobic than the central area, and the edges which present areas with the least hydrophobicity, and which can be hydrophilic. Alternatively, each profiled feature in a plurality of profiled features can be fabricated with differing laser energy to provide differing localized areas with differing adsorbing properties in each profiled feature as described at page 16, line 21 to page 17, line 3.

The structures of the present invention can be tailored to adsorb molecules of interest in a specific localized area such as the centre of a micro-well or the edge of a micro-channel. Alternatively, the structures of the present invention provide a diverse surface which provides at least one localized area particularly suitable for adsorbing a molecule of interest. The structure

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of the present invention does not provide a surface with uniform adsorbing properties which will adsorb different molecules with differing strengths or at differing concentrations. Instead the structure of the present invention presents a diverse surface so that different molecules are adsorbed at different localized areas.

With respect to Claims 15 and 16, Applicants respectfully suggest that the Examiner has misinterpreted these claims. Claims 15 and 16 refer to a blocking layer disposed on the surface of the second layer. These features are further described in the present specification at page 9, line 4 to page 10, line 6. In the present invention the blocking layer forms a third layer disposed on the surface of the second ablatable layer and remains on the surface of the second layer to repel any molecules that are intended to be adsorbed on the exposed surface of the first layer from adsorbing on the surface of the second layer. This is not the case in Brizzolara. In Brizzolara, it is clear from column 3, lines 16 to 24 that the "blocking" is not applied to the surface of the antibody resistant material (the second layer) but instead is applied to ensure that any exposed surface of the antibody-adsorbent substrate (the first layer) that has not bound antibody, is blocked from adsorbing contaminating antibodies or proteins. The blocking layer in Brizzolara is not applied to the second layer and it is not present during removal of the second layer.

In conclusion, Brizzolara does not anticipate the claimed invention because Brizzolara does not teach each and every element of the claimed invention. Brizzolara does not teach that the ablated layer should have localized areas having different localized areas having different molecule-adsorbing capacities, but only a single surface property of hydrophobicity. Applicants respectfully request withdrawal of the rejection under 35 U.S.C. §102(b)

Rejections under 35 U.S.C. §102(a)

The Examiner has rejected Claims 1-23 and 39-42 under §102(a) as anticipated by Ivanova, et al. (Ivanova, E., Wright, J., Pham, D., Filipponi, L., Viezzoli, A., and Nicolau, D.; Langmuir 2002, 18, 9439-9546). Ivanova et al. is a publication made by the inventors within the 12 month grace period of §102(b). Enclosed is a Declaration under *In re Katz*, which states that the non-inventor authors did not contribute to the patentable idea. Accordingly, the Ivanova et al. reference is not a publication of "another," and does not qualify as prior art under §102(a). Thus, Applicants respectfully request withdrawal of this rejection.

Rejection under 35 U.S.C. §103(a)

a. Brizzolara in view of Wohlstadter et al.

Claims 6-7 and 11 are rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Wohlstadter et al (US 6,066,448). The Examiner states that Wohlstadter teaches that the exposed surface of the polymeric material has localized areas which have diverse surface properties (hydrophobic or hydrophilic).

The law is clear that three basic criteria must be met to establish a *prima facie* case of obviousness: (MPEP ¶2143):

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references, when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1440 (Fed. Cir. 1991)).

As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have "different localized areas having different molecule-adsorbing capacities", but only a single surface property of hydrophobicity.

Wohlstadter teaches a patterned multi-array, multi-specific surface for electrochemiluminescence-based tests which allows for a voltage to be applied. The pattern is produced to allow specific areas for binding and can be produced by patterning of self-assembled monolayers. Since column 17, lines 17-49 of Wohlstadter *et al.* does not teach or suggest using localized areas with different molecule-adsorbing capacities to adsorb molecules of interest. Wohlstadter et al. only teaches the use of patterned hydrophobic/hydrophilic regions to prevent spreading of applied fluids or gels. Therefore, Brizzolara in combination with Wohlstadter does not teach all of the claim elements.

Furthermore, Wohlstadter *et al.* is directed to complex electrochemiluminescent assays which require one or more electrode and counter electrode pairs to trigger electrochemiluminescence and Brizzolara relates to binding of antibodies on a hydrophobic surface for assay purposes. As discussed above, the patterned hydrophobic/hydrophilic regions are disclosed to be solely to prevent spreading of applied fluids or gels and not for differential adsorption of

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molecules. Accordingly, there would have been no motivation to combine Brizzolara with Wohlstadter et al. to produce the invention as claimed. A person of ordinary skill in the art would not have considered Wohlstadter *et. al.* or Brizzolara relevant to the laser ablation of shallow-profiled features with surfaces having areas tailored to accommodate the universal adsorption of molecules as described and claimed in the present application and therefore would not have combined these documents.

Column 17, lines 17-49 of Wohlstadter *et. al.* does describe the use of patterned hydrophobic/hydrophilic regions to prevent spreading of applied fluids or gels. However, this implies that the fluids or gels are being applied to a flat surface rather than a profiled surface and that the hydrophobic and hydrophilic regions are present to prevent inter-spot contamination, particularly since these regions are referred to as "border aids." Furthermore, at column 17, lines 44 to 49, Wohlstadter *et. al.* indicates that controlled solution deposition can also be achieved using physical surface features such as wells or channels. Since all of the binding occurs within these wells or channels, the teaching of Wohlstadter et al. would suggest to the skilled artisan that one would not want different localized areas having different molecule-adsorbing capacities on the same profiled feature.

Thus, one skilled in the art would not be motivated to combine Brizzolara and Wohlstadter et al. Moreover, even if one did combine these references, the combination would not render the invention obvious because the combination would not lead to the claimed invention.

b. Brizzolara in view of Slovacek et al.

Claims 8-10 are rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Slovacek et al (US 5,340,715). As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have "different localized areas having different molecule-adsorbing capacities", but only a single hydrophobic area. The Examiner states that Slovacek et al teaches a first layer of polymethylmethacrylate. Slovacek et al teaches an evanescent wave sensor and method for use in analyzing one or more media. The waveguide uses an input signal propagated along the waveguide between two surfaces. However, the combination of Brizzolara with Slovacek still does not teach that the surface of PMMA exposed during a laser ablation process has localized areas having different surface properties as claimed in the present claims.

Furthermore, Slovacek *et. al.* is directed to a multiple surface evanescent wave sensor and Brizzolara relates to binding antibodies on a hydrophobic surface for assay purposes. A person of ordinary skill in the art would not have considered Slovacek *et. al.* in combination with Brizzolara to be relevant to the laser ablation of shallow-profiled features with surfaces having areas tailored to accommodate the universal adsorption of molecules as described and claimed in the present application.

c. *Brizzolara in view of Sheppard et al.*

Claims 12-14 are rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Sheppard et al. (US 6,143,247). As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have “different localized areas having different molecule-adsorbing capacities”, but only a single surface property of hydrophobicity. The Examiner states that Sheppard et al teaches that the second layer is a metal and can be deposited in a thin layer. However, none of Sheppard *et. al.*, Brizzolara or their combination, teach that the gold layer can be ablated using laser ablation to expose a first layer having different surface properties as claimed in the present claims. A person of ordinary skill in the art would not have considered the present claims obvious in light of Brizzolara in view of Sheppard *et. al.*

Furthermore, Sheppard *et. al.* is directed to detecting particulates in a fluid and Brizzolara relates to the binding of antibodies on hydrophobic surfaces for assay purposes. A person of ordinary skill in the art would not have considered Sheppard *et. al.* in combination with Brizzolara relevant to the laser ablation of shallow-profiled features with surfaces having areas tailored to accommodate the universal adsorption of molecules as described and claimed in the present application.

d. *Brizzolara in view of Kris et al.*

Claims 17-19 are rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Kris et al. (US 5,858,801). As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have “different localized areas having different molecule-adsorbing capacities”, but only a single surface property of hydrophobicity. The Examiner states that Kris et al teaches that a substrate supports first and second layers. However, the combination of Brizzolara and Kris et al. does not teach that the glass substrate can support a first and second layer where the second

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layer is laser ablated to provide at least one profiled feature where the exposed surface of the first layer has localized areas having different surface properties as claimed in the claims as proposed to be amended. A person of ordinary skill in the art would not consider the present claims obvious in light of the combination of Brizzolara in view of Kris *et. al.*

e. Brizzolara in view of Wilding et al

Claims 20 and 22-23 are rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Wilding et al (US 5,587,128). As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have “different localized areas having different molecule-adsorbing capacities”, but only a single surface property of hydrophobicity. The Examiner states that Wilding et al teaches flow channels having a cross-sectional dimension between 0.2 and 1000 μm .

Wilding *et. al.* describes flow channels that have a cross-sectional dimension between 0.1 microns and 1000 microns and a width or depth of about 20 to 500 microns and that the channels can contain binding moieties such as antibodies. However, Wilding *et. al.* alone or in combination with Brizzolara does not teach that the channels are formed by laser ablation of a second layer to expose a first layer where the exposed surface of the first layer has localized areas having different surface properties. A person of skill in the art would not have considered claims 20 and 22 to 23 obvious in light of Brizzolara in view of Wilding *et. al.*

f. Brizzolara in view of Clark et al.

Claim 21 is rejected under 35 U.S.C. §103(a) as unpatentable over Brizzolara in view of Clark et al (US 4,802,951). As stated in the anticipation rejection above, Brizzolara does not teach all of the claimed elements because Brizzolara does not teach that the ablated layer should have “different localized areas having different molecule-adsorbing capacities”, but only a single surface property of hydrophobicity. The Examiner states that Clark et al teaches a diameter of 0.1 and 1 micron. However, Clark *et. al.*, alone or in combination with Brizzolara, does not teach the holes or pits in the array are formed by laser ablation of a second layer to expose a first layer where the exposed surface of the first layer has localized areas having different surface properties. A person of skill in the art would not have considered claims 20 and 22 to 23 obvious in light of Brizzolara in view of Clark *et. al.*

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Conclusion

In view of Applicants' amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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